



60N08

Preliminary

Power MOSFET

60 Amps, 80 Volts N-CHANNEL POWER MOSFET

DESCRIPTION

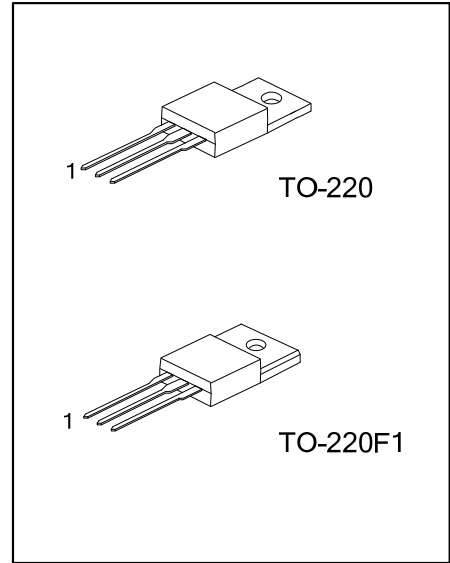
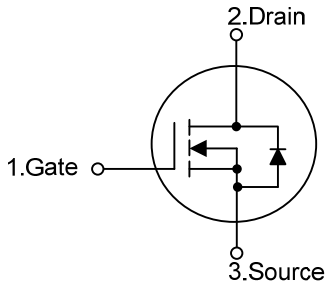
The UTC **60N08** is an N-channel power MOSFET adopting UTC's advanced planar stripe and DMOS technology to provide designers with perfectly high switching speed and minimum on-state resistance. It also can withstand high energy pulse in the avalanche and commutation modes.

The UTC **60N08** is applied in low voltage applications such as DC motor control, automotive, and high efficiency switching for DC/DC converters.

FEATURES

- * 60A, 80V, $R_{DS(ON)}=0.024\Omega @ V_{GS}=10V$
- * High switching speed
- * 100% avalanche tested

SYMBOL



ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|--------------|----------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 60N08L-TA3-T | 60N08G-TA3-T | TO-220 | G | D | S | Tube |
| 60N08L-TF1-T | 60N08G-TF1-T | TO-220F1 | G | D | S | Tube |

Note: Pin Assignment: G: Gate D: Drain S: Source

| | |
|--|---|
| <p>60N08L - TF1 - T</p> <p>(1) Packing Type (2) Package Type (3) Lead Free</p> | <p>(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1 (3) G: Halogen Free, L: Lead Free</p> |
|--|---|

■ ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|--------------------------------------|------------------------|-----------|------------|------------------|
| Drain to Source Voltage | | V_{DSS} | 80 | V |
| Gate to Source Voltage | | V_{GSS} | ± 25 | V |
| Continuous Drain Current | Continuous | I_D | 60 | A |
| | Pulsed | I_{DM} | 176 | A |
| Avalanche Energy | Single Pulsed (Note 2) | E_{AS} | 560 | mJ |
| | Repetitive (Note 1) | E_{AR} | 8.5 | mJ |
| Peak Diode Recovery dv/dt (Note 3) | | dv/dt | 6.5 | V/ns |
| Power Dissipation | TO-220 | P_D | 100 | W |
| | TO-220F1 | | 70 | W |
| Junction Temperature | | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature | | T_{STG} | -55 ~ +175 | $^\circ\text{C}$ |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---------------------|----------|---------------|---------|--------------------|
| Junction to Ambient | TO-220 | θ_{JA} | 62.5 | $^\circ\text{C/W}$ |
| | TO-220F1 | | 62.5 | $^\circ\text{C/W}$ |
| Junction to Case | TO-220 | θ_{JC} | 1.25 | $^\circ\text{C/W}$ |
| | TO-220F1 | | 1.77 | $^\circ\text{C/W}$ |

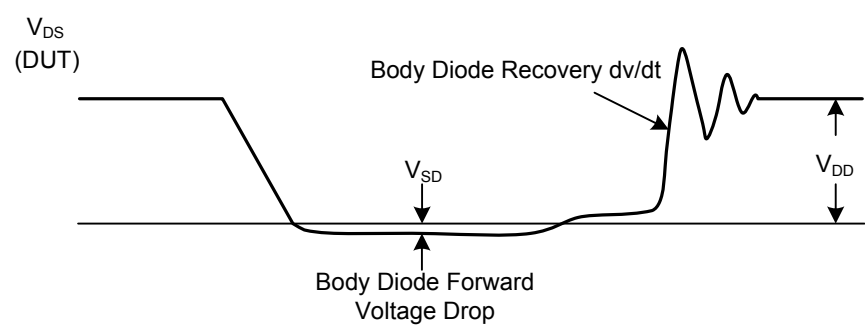
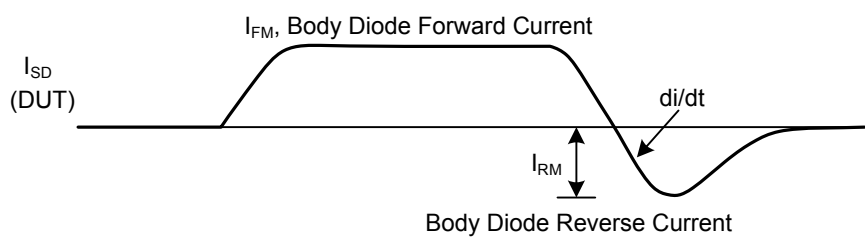
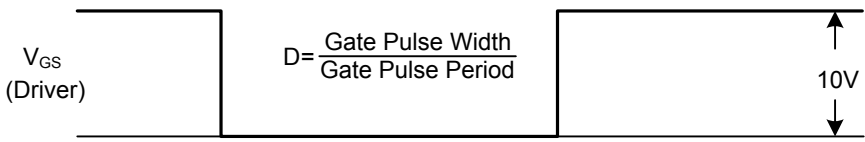
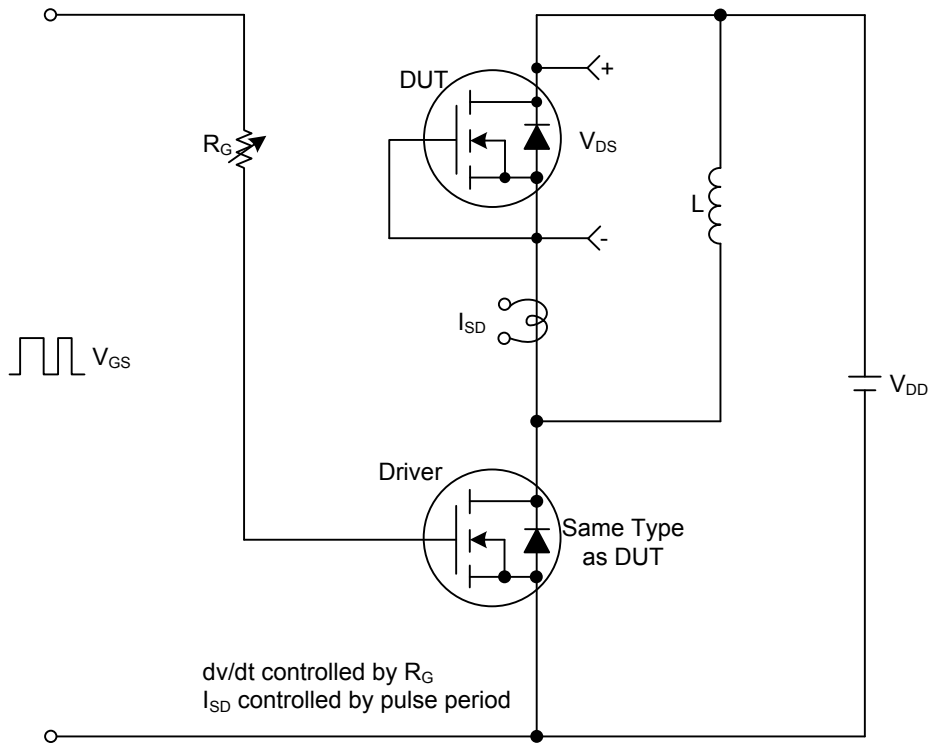
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|-------------------------------------|---|-----|-------|-------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 80 | | | V |
| Breakdown Voltage Temperature Coefficient | ΔBV _{DSS} /ΔT _J | I _D =250μA, Referenced to 25°C | | 0.07 | | V/°C |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =80V, V _{GS} =0V | | | 1 | μA |
| | | V _{DS} =64V, T _C =150°C | | | 10 | μA |
| Gate-Source Leakage Current | Forward | I _{GSS} | | | +100 | nA |
| | Reverse | | | | | |
| | | | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | V _{DS} =V _{GS} , I _D =250μA | 2.0 | | 4.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =30A | | 0.018 | 0.024 | Ω |
| Forward Transconductance | g _{FS} | V _{DS} =30V, I _D =30A (Note 4) | | 31 | | S |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =25V, V _{GS} =0V, f=1.0MHz | | 1450 | 1900 | pF |
| Output Capacitance | C _{OSS} | | | 520 | 680 | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 120 | 155 | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q _G | V _{DS} =64V, V _{GS} =10V, I _D =60A (Note 4,5) | | 50 | 65 | nC |
| Gate-Source Charge | Q _{GS} | | | 9.3 | | nC |
| Gate-Drain Charge | Q _{GD} | | | 25 | | nC |
| Turn-ON Delay Time | t _{D(ON)} | V _{DD} =40V, I _D =60A, R _G =25Ω (Note 4,5) | | 16.5 | 45 | ns |
| Turn-ON Rise Time | t _R | | | 200 | 410 | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 70 | 150 | ns |
| Turn-OFF Fall Time | t _F | | | 95 | 200 | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I _S | | | | 60 | A |
| Maximum Body-Diode Pulsed Current | I _{SM} | | | | 176 | A |
| Drain-Source Diode Forward Voltage | V _{SD} | I _S =60A, V _{GS} =0V | | | 1.5 | V |
| Body Diode Reverse Recovery Time | t _{RR} | V _{GS} =0V, I _S =60A, | | 73 | | ns |
| Body Diode Reverse Recovery Charge | Q _{RR} | di _F /dt=100A/μs (Note 4) | | 185 | | μC |

- Notes : 1. Repetitive Rating: Pulse width limited by maximum junction temperature
 2. L=0.4mH, I_{AS}=44A, V_{DD}=25V, R_G=25Ω, Starting T_J=25°C
 3. I_{SD} ≤60A, di/dt ≤300A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
 4. Pulse Test : Pulse width ≤300μs, Duty cycle ≤2%
 5. Essentially independent of operating temperature

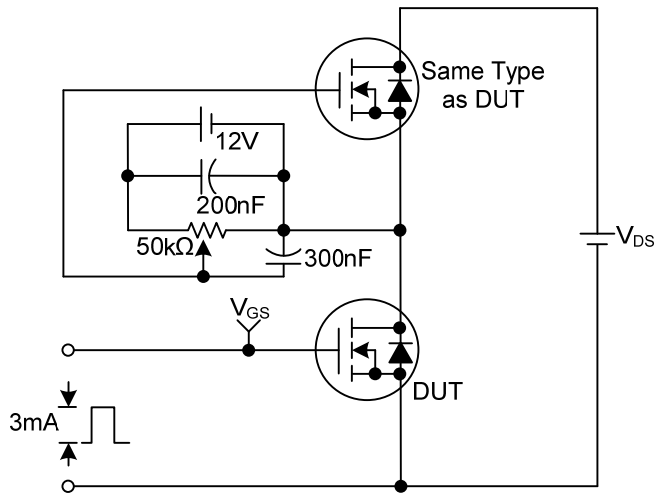
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

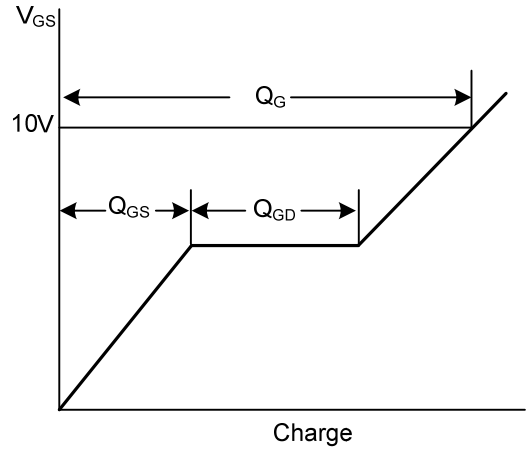


■ TEST CIRCUITS AND WAVEFORMS(Cont.)

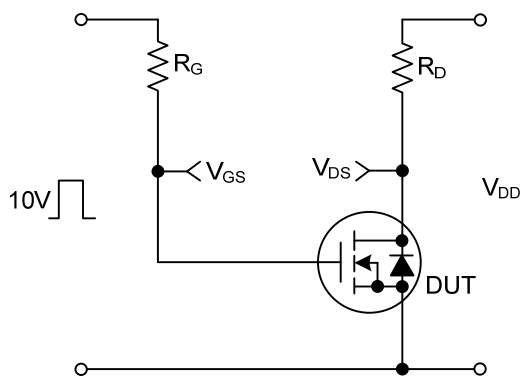
Gate Charge Test Circuit



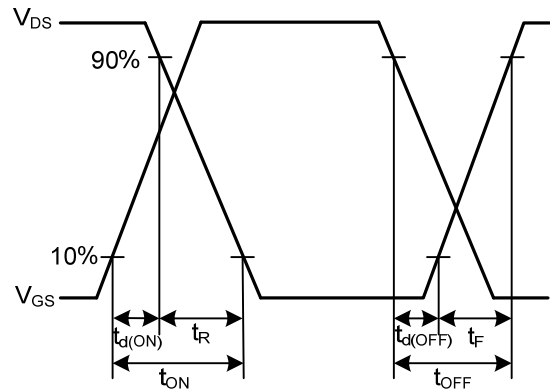
Gate Charge Waveforms



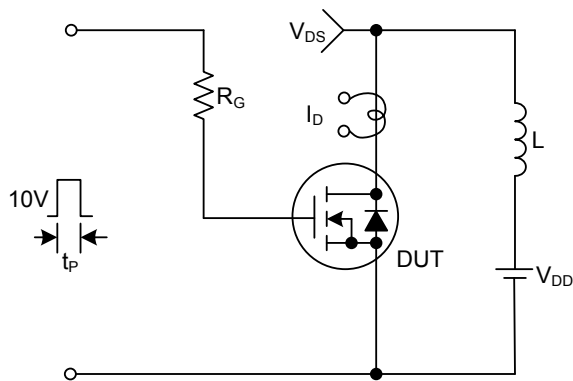
Resistive Switching Test Circuit



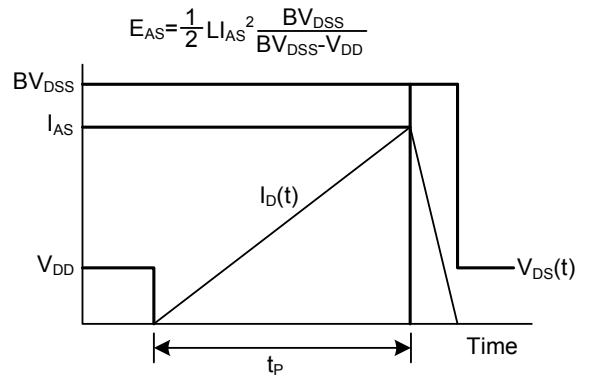
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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